FIG. 1

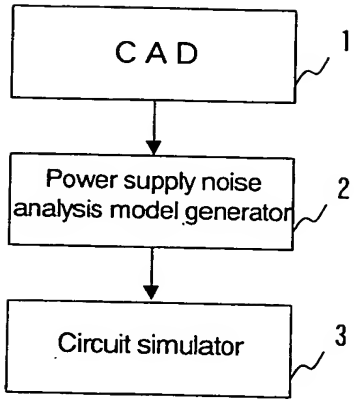
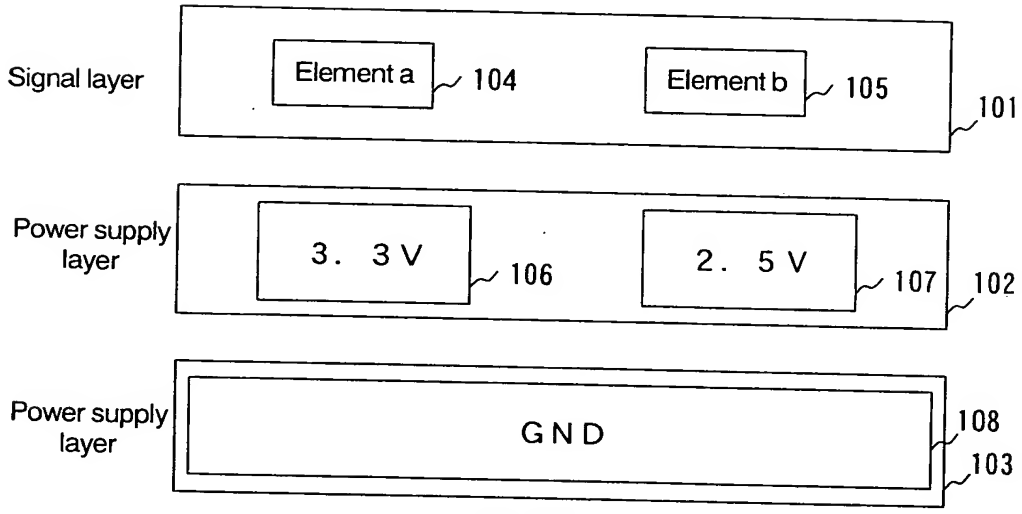
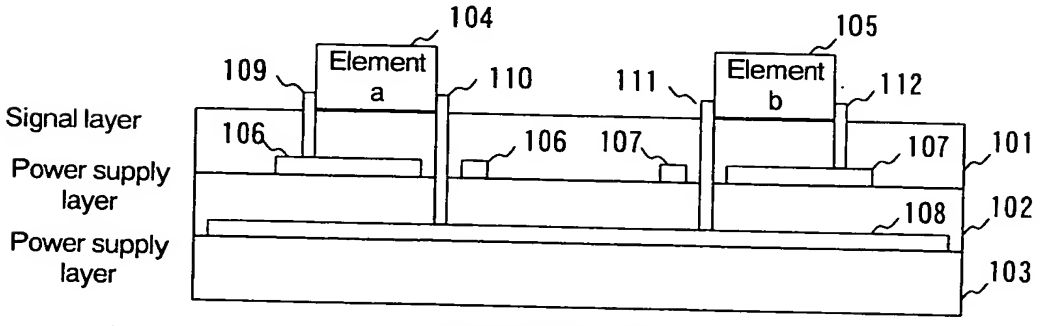


FIG. 2A



Plan view

FIG. 2B



Cross-sectional view

FIG. 3

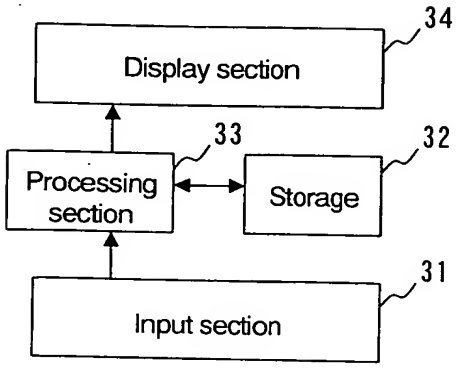

Display section
34
Processing section
33
Storage
32
Input section
31

FIG. 4

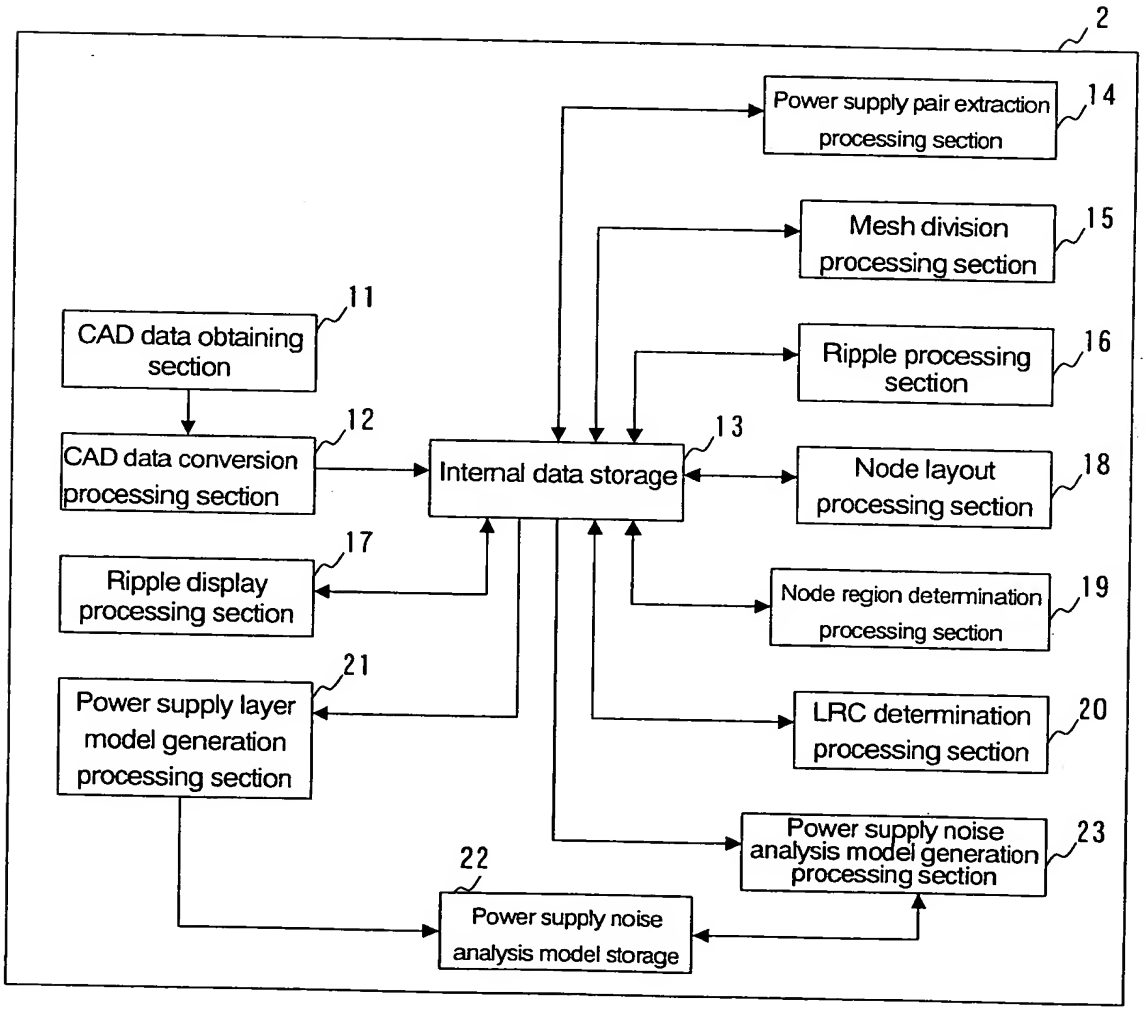

2
Power supply pair extraction processing section
14
Mesh division processing section
15
CAD data obtaining section
11
Ripple processing section
16
CAD data conversion processing section
12
Internal data storage
13
Node layout processing section
18
Ripple display processing section
17
Node region determination processing section
19
Power supply layer model generation processing section
21
LRC determination processing section
20
Power supply noise analysis model generation processing section
23
22
Power supply noise analysis model storage

FIG. 5

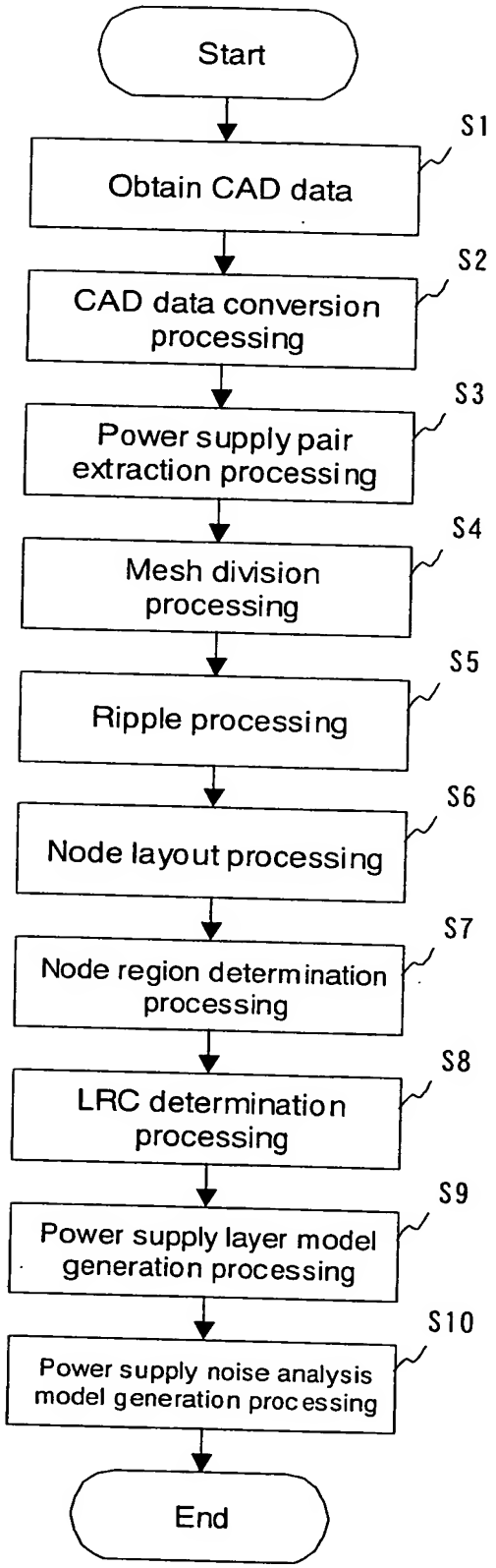

Start
S1
Obtain CAD data
S2
CAD data conversion processing
S3
Power supply pair extraction processing
S4
Mesh division processing
S5
Ripple processing
S6
Node layout processing
S7
Node region determination processing
S8
LRC determination processing
S9
Power supply layer model generation processing
S10
Power supply noise analysis model generation processing
End

FIG. 6

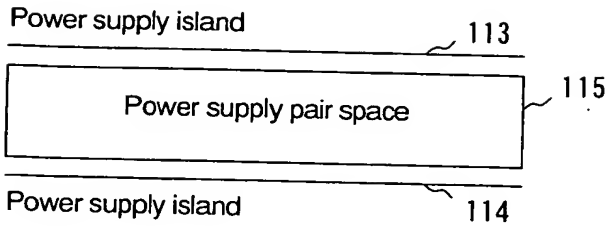

Power supply island
113
Power supply pair space
115
Power supply island
114

FIG. 7

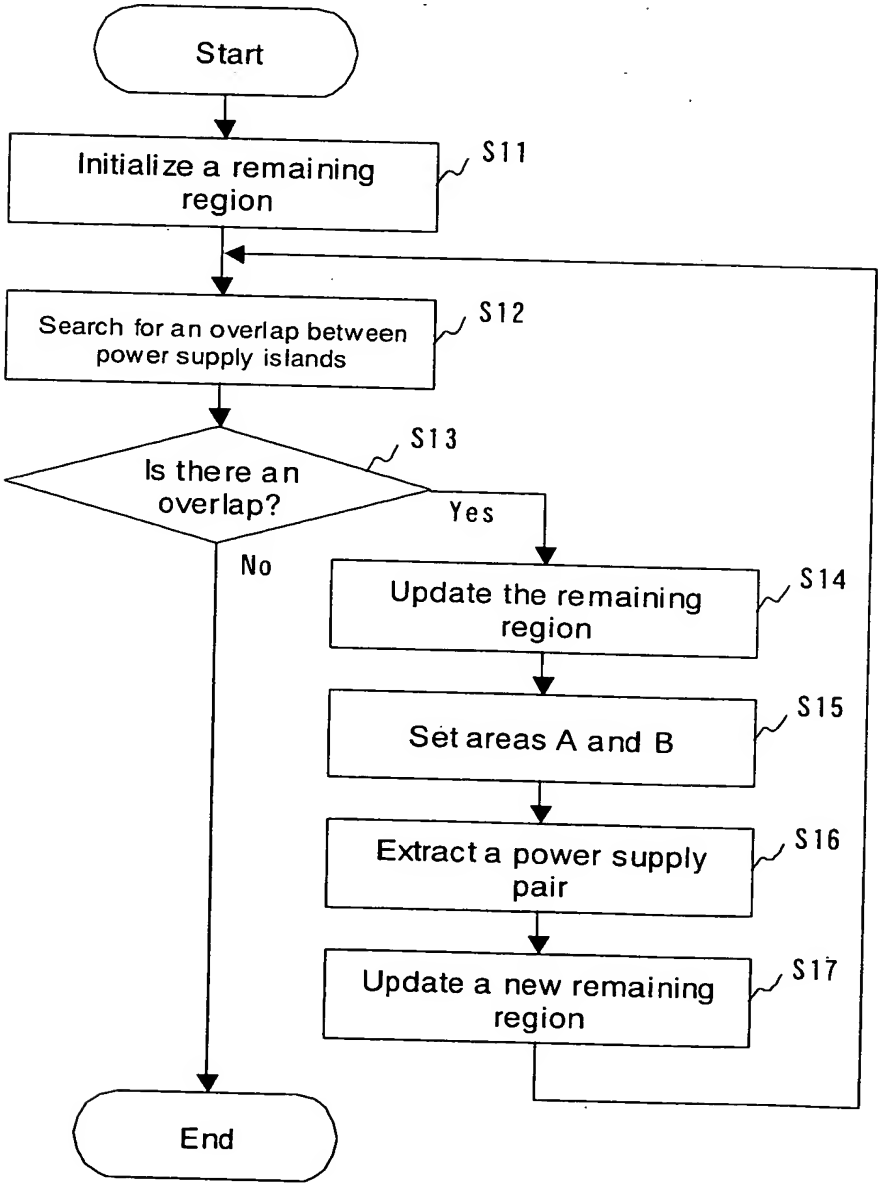

Start
Initialize a remaining region
S11
Search for an overlap between power supply islands
S12
Is there an overlap?
S13
Yes
No
Update the remaining region
S14
Set areas A and B
S15
Extract a power supply pair
S16
Update a new remaining region
S17
End

FIG. 8A

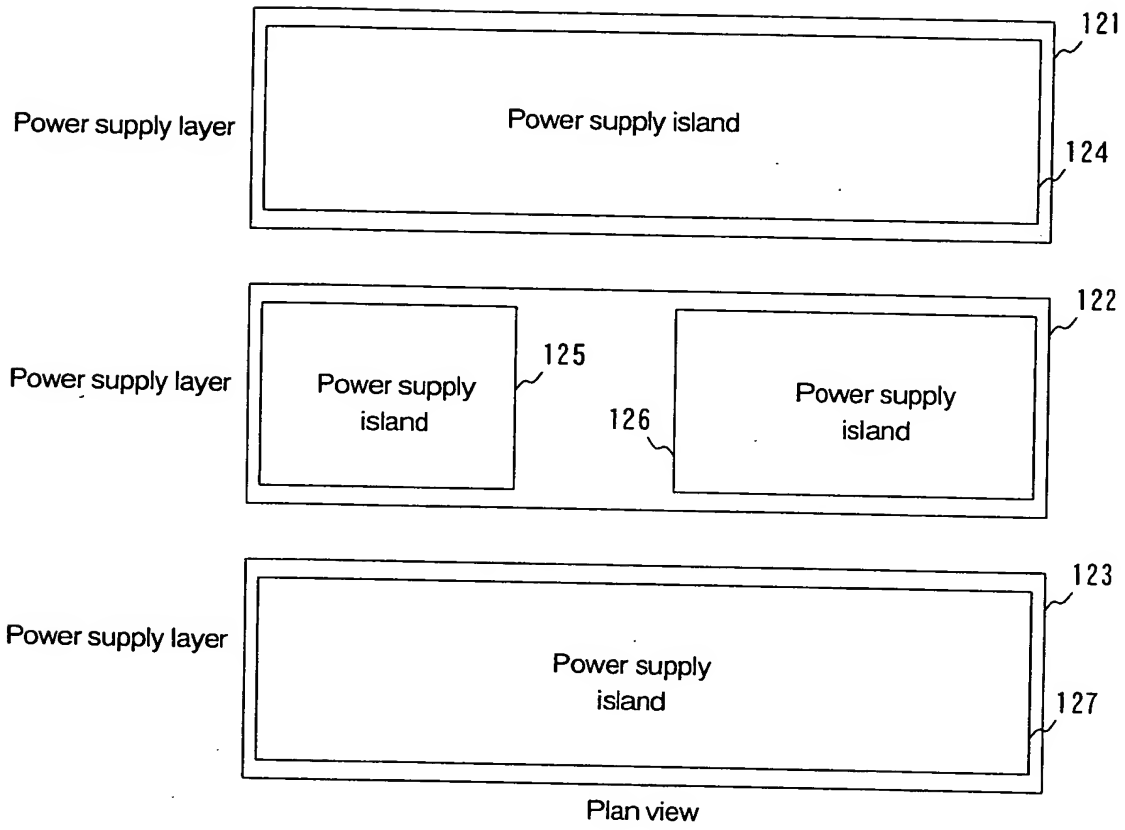

Power supply layer
Power supply island
121
124
Power supply layer
Power supply island
125
126
Power supply island
122
Power supply layer
Power supply island
123
127
Plan view

FIG. 8B

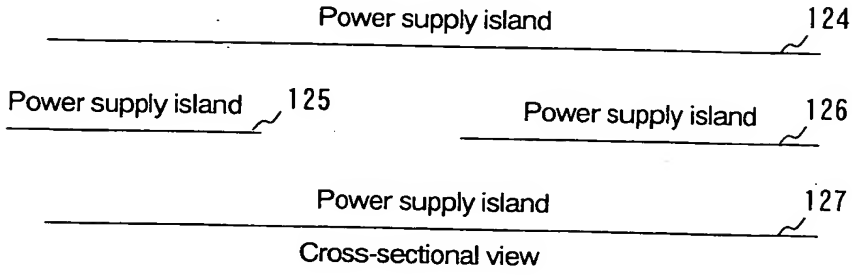

Power supply island
124
Power supply island
125
Power supply island
126
Power supply island
127
Cross-sectional view

FIG. 9A

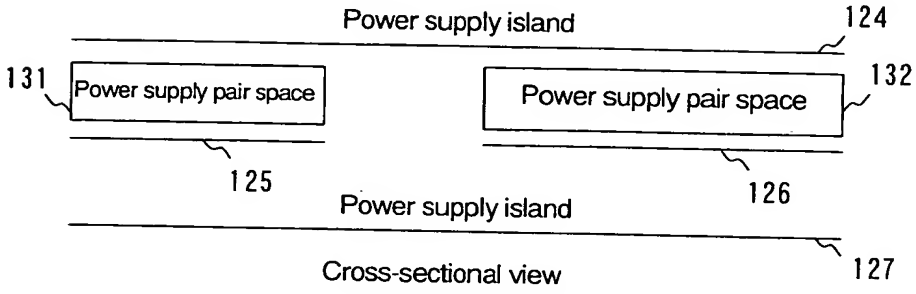


FIG. 9B

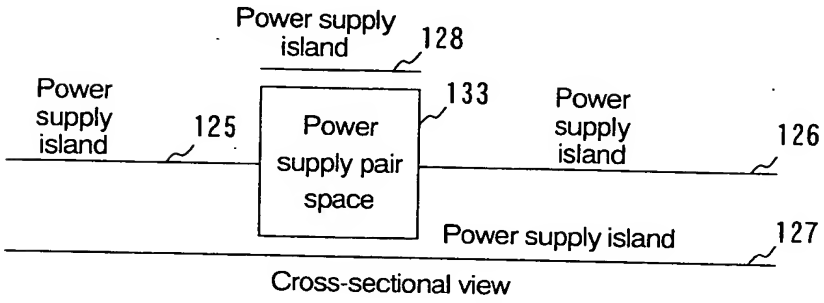


FIG. 9C

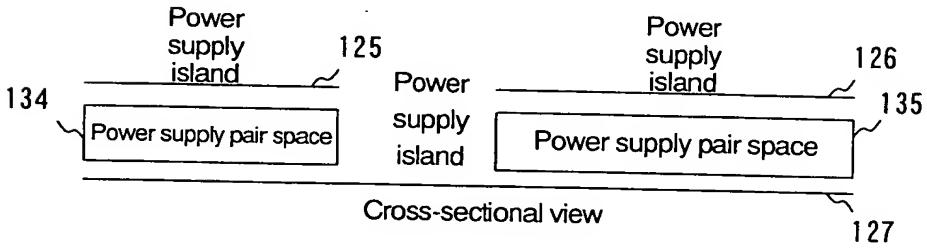


FIG. 10A

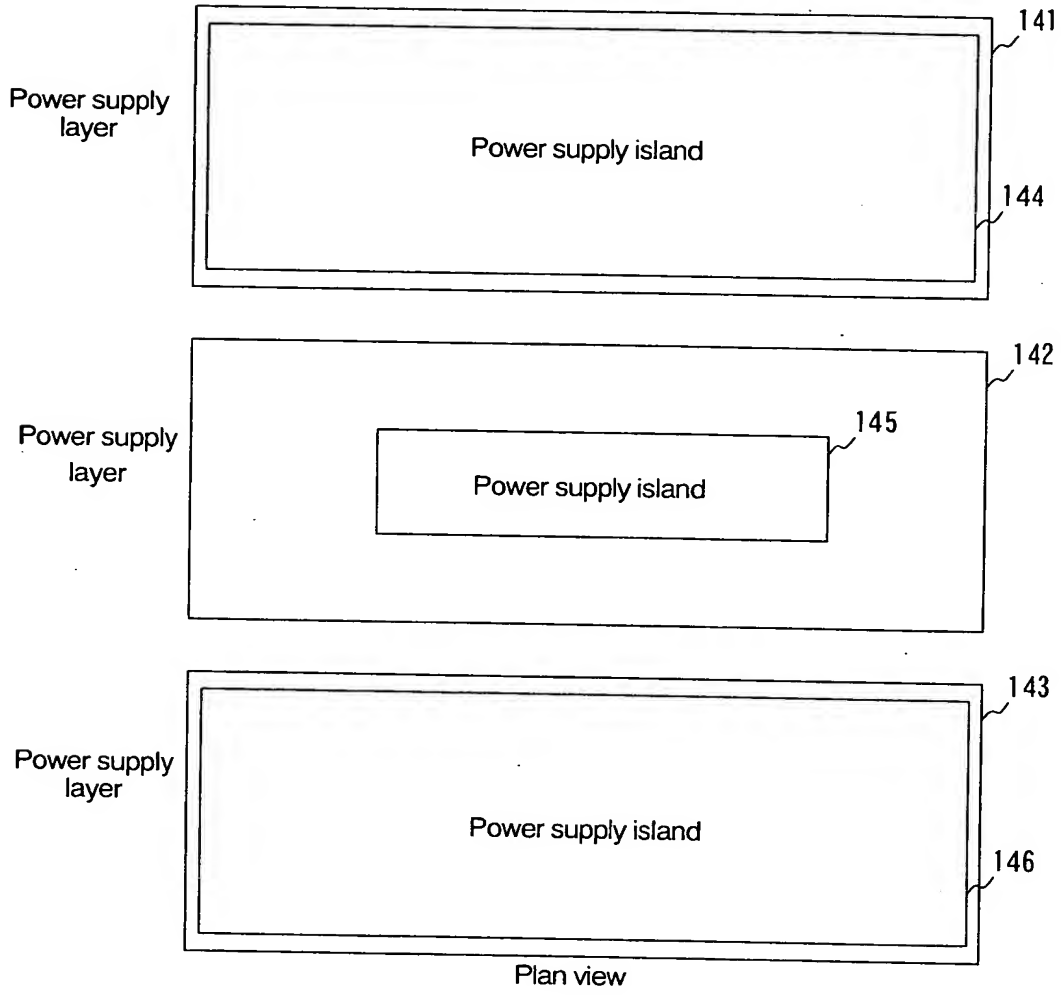


FIG. 10B

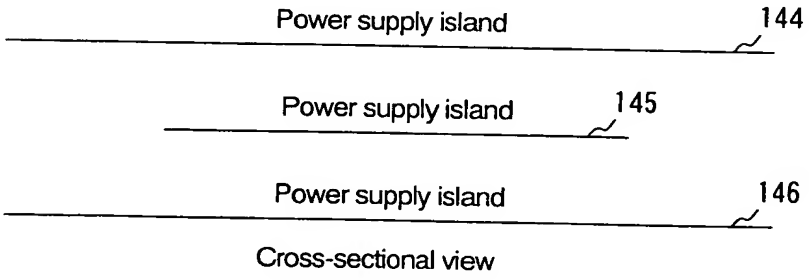
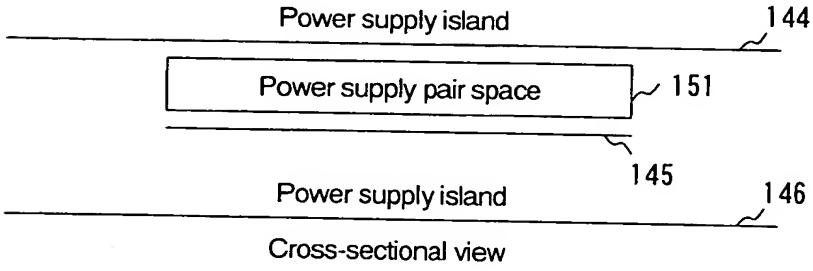
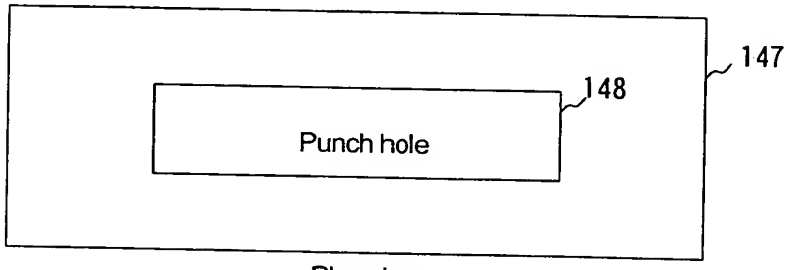


FIG. 11A



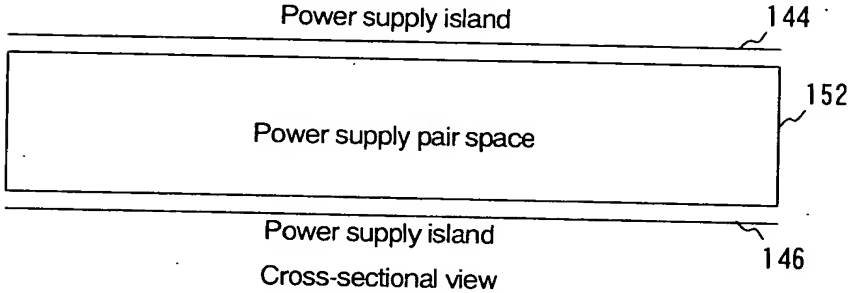
Cross-sectional view

FIG. 11B



Plan view

FIG. 11C



Cross-sectional view

FIG. 12

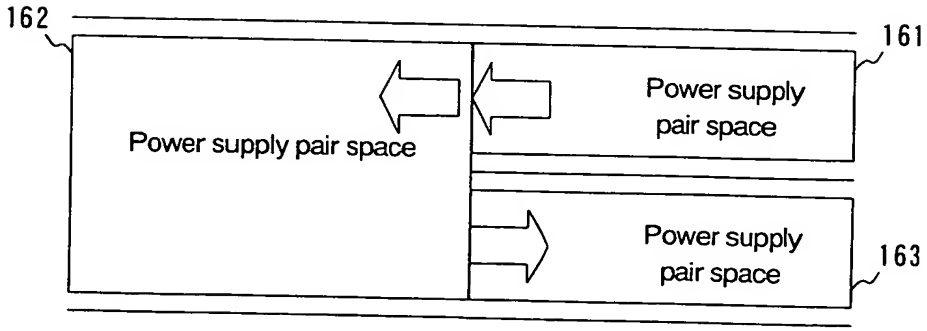


FIG. 13

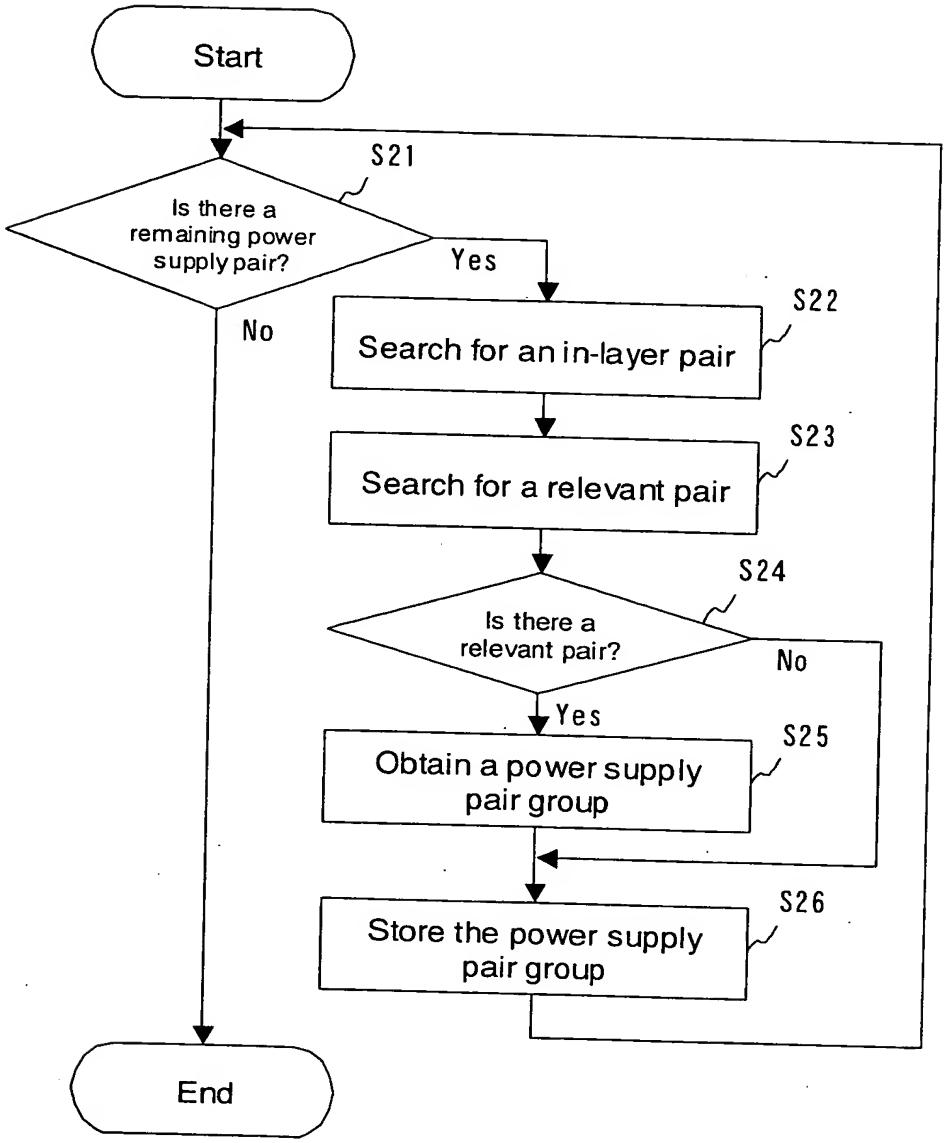
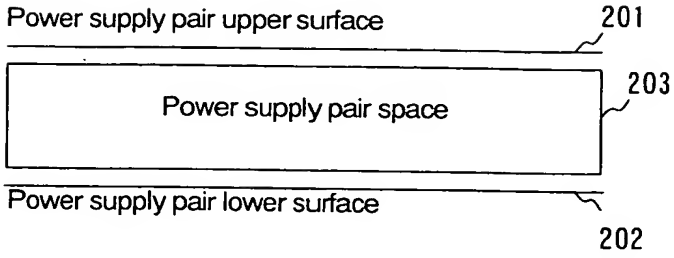
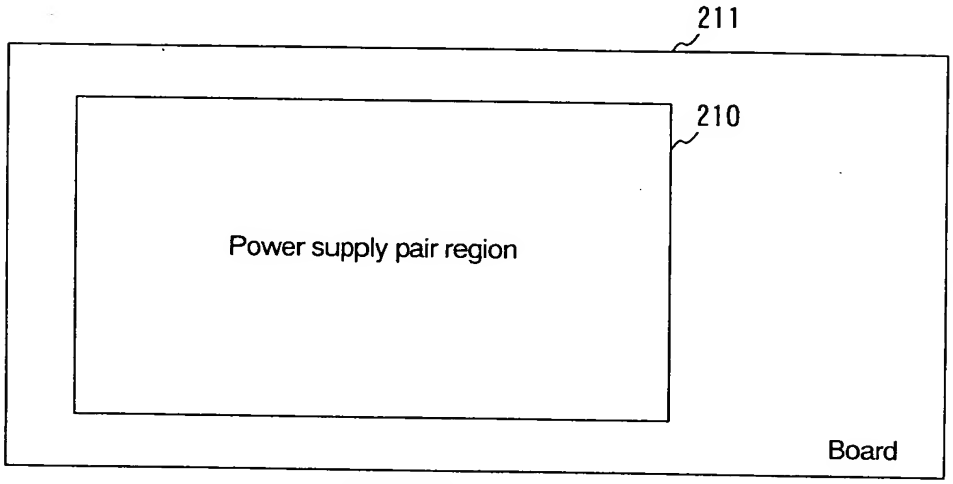

Start
S21
Is there a remaining power supply pair?
Yes
No
S22
Search for an in-layer pair
S23
Search for a relevant pair
S24
Is there a relevant pair?
No
Yes
S25
Obtain a power supply pair group
S26
Store the power supply pair group
End

FIG. 14A



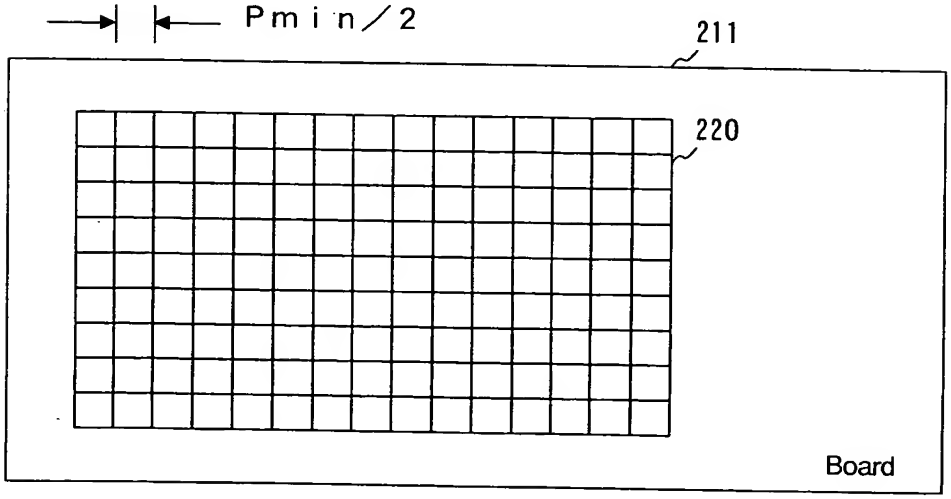
Cross-sectional view

FIG. 14B



Plan view

FIG. 14C



Plan view

FIG. 15

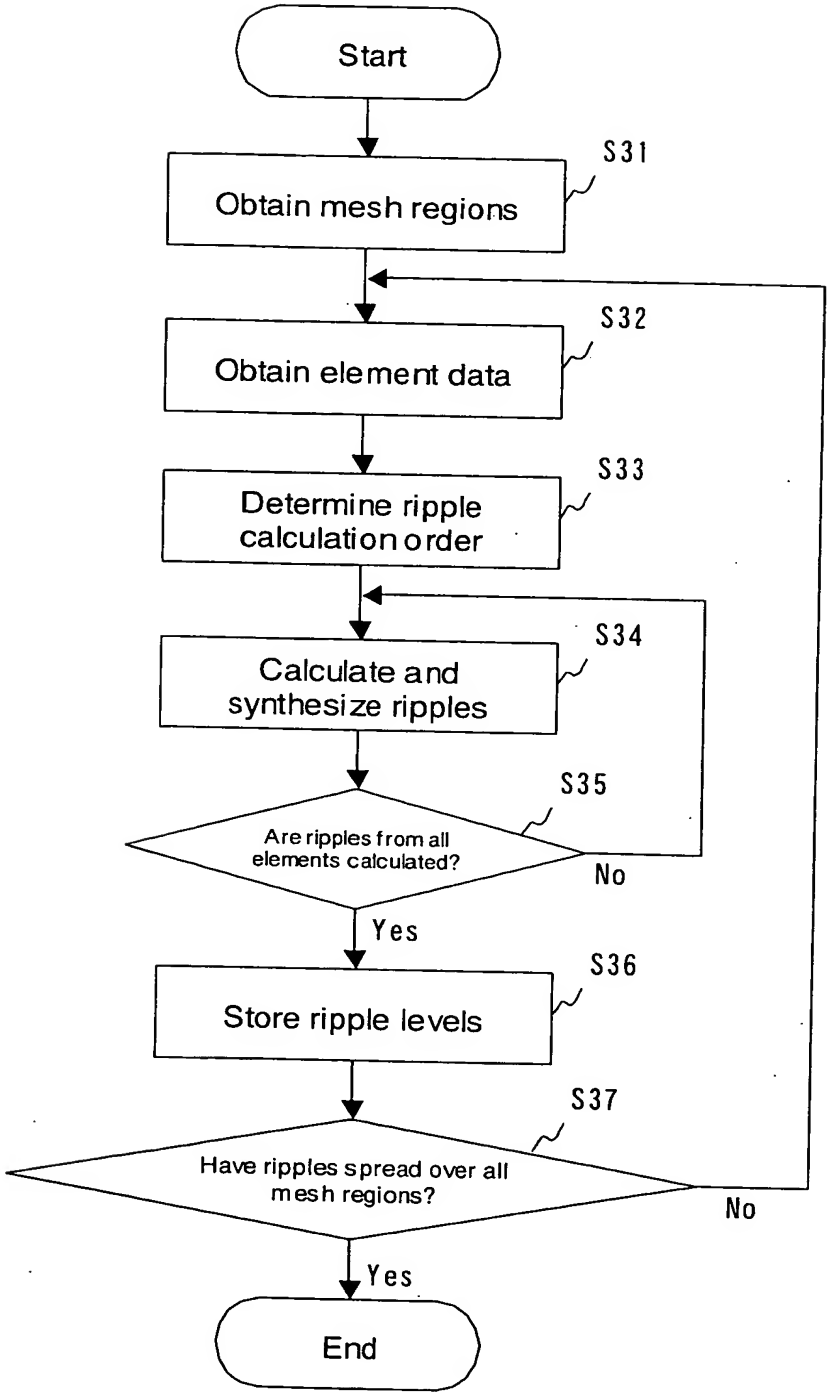

Start
S31
Obtain mesh regions
S32
Obtain element data
S33
Determine ripple calculation order
S34
Calculate and synthesize ripples
S35
Are ripples from all elements calculated?
No
Yes
S36
Store ripple levels
S37
Have ripples spread over all mesh regions?
No
Yes
End

FIG. 16

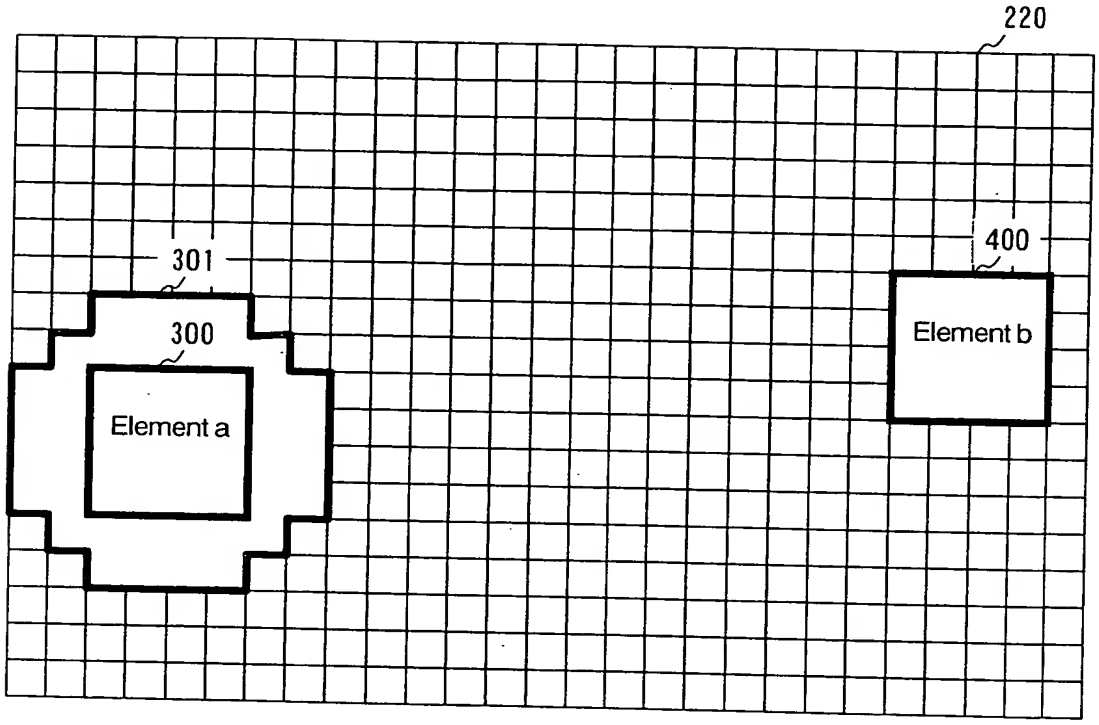

220
301
300
Element a
400
Element b

FIG. 17

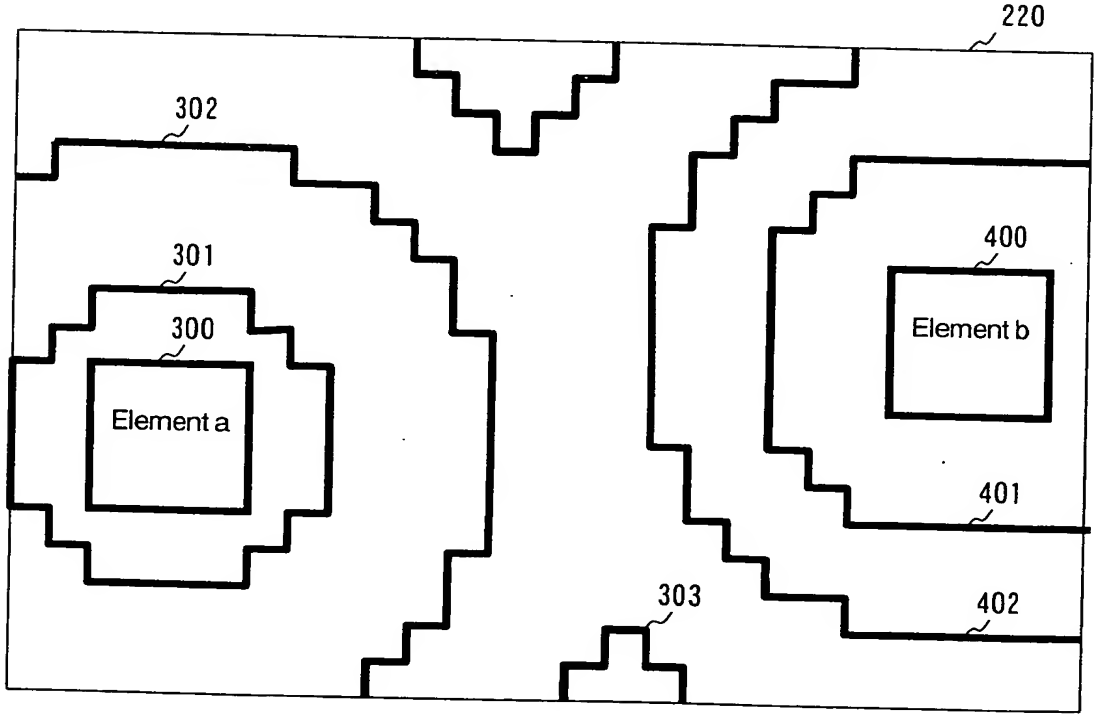

220
302
301
300
Element a
400
Element b
401
303
402

FIG. 18

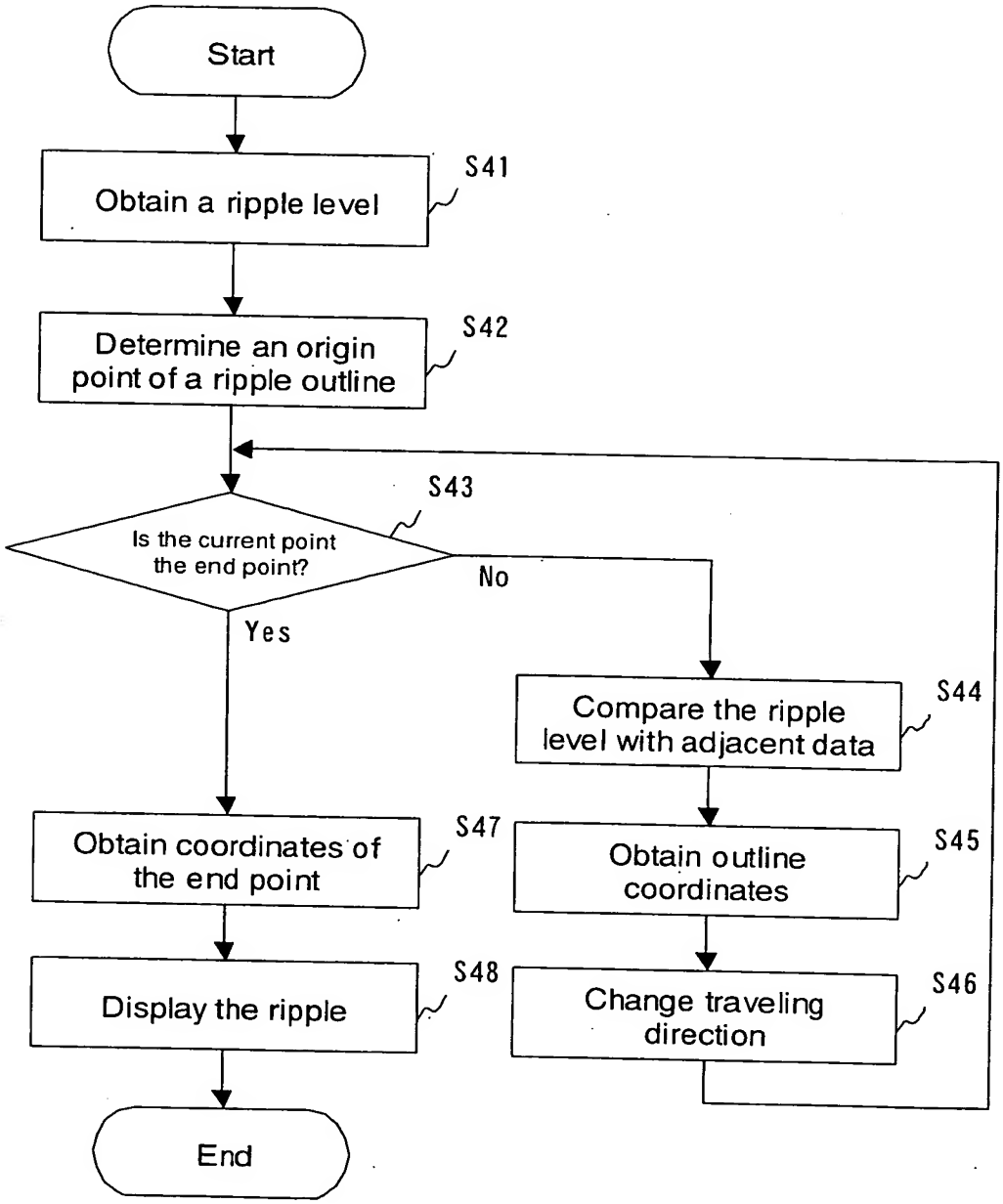

Start
Obtain a ripple level
S41
Determine an origin point of a ripple outline
S42
S43
Is the current point the end point?
No
Yes
Compare the ripple level with adjacent data
S44
Obtain outline coordinates
S45
Change traveling direction
S46
Obtain coordinates of the end point
S47
Display the ripple
S48
End

FIG. 19A

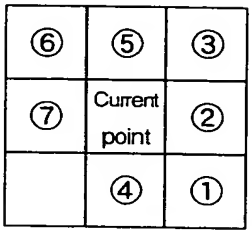


FIG. 19B

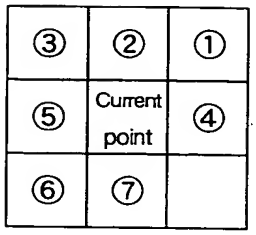


FIG. 19C

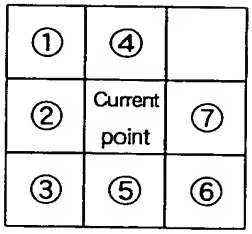


FIG. 19D

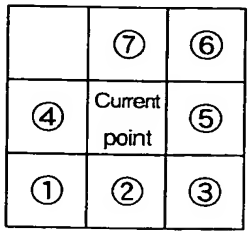


FIG. 20A

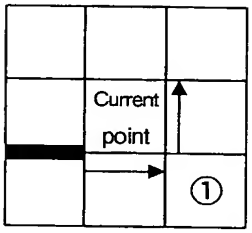


FIG. 20B

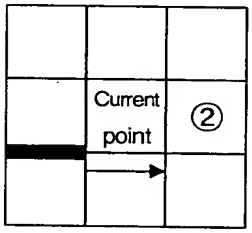


FIG. 20C

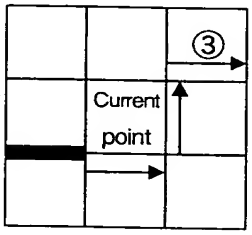


FIG. 20D

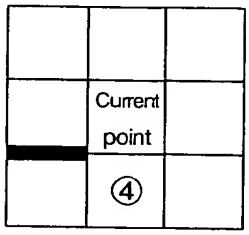


FIG. 20E

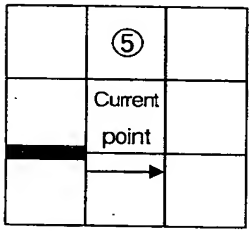


FIG. 20F

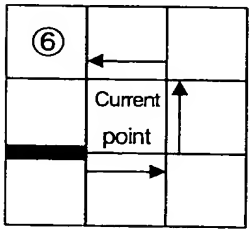


FIG. 20G

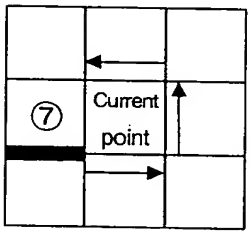


FIG. 21

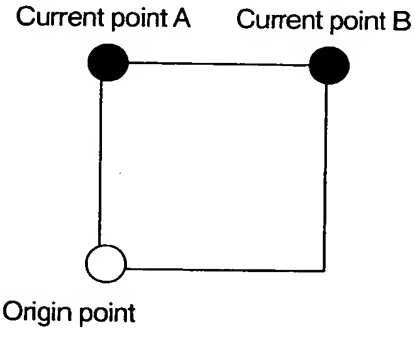


FIG. 22

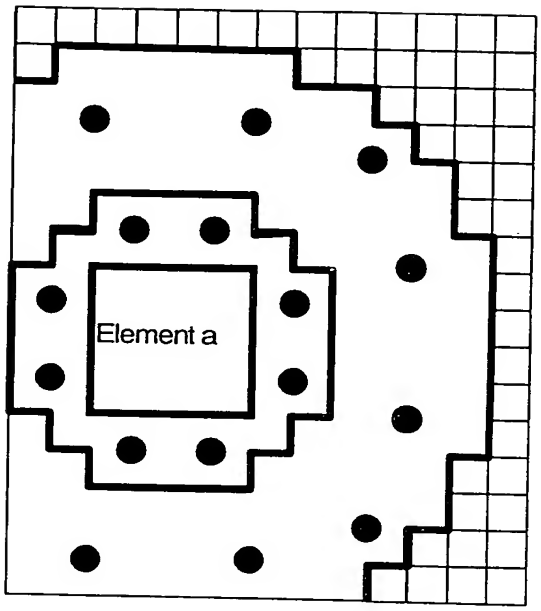


FIG. 23

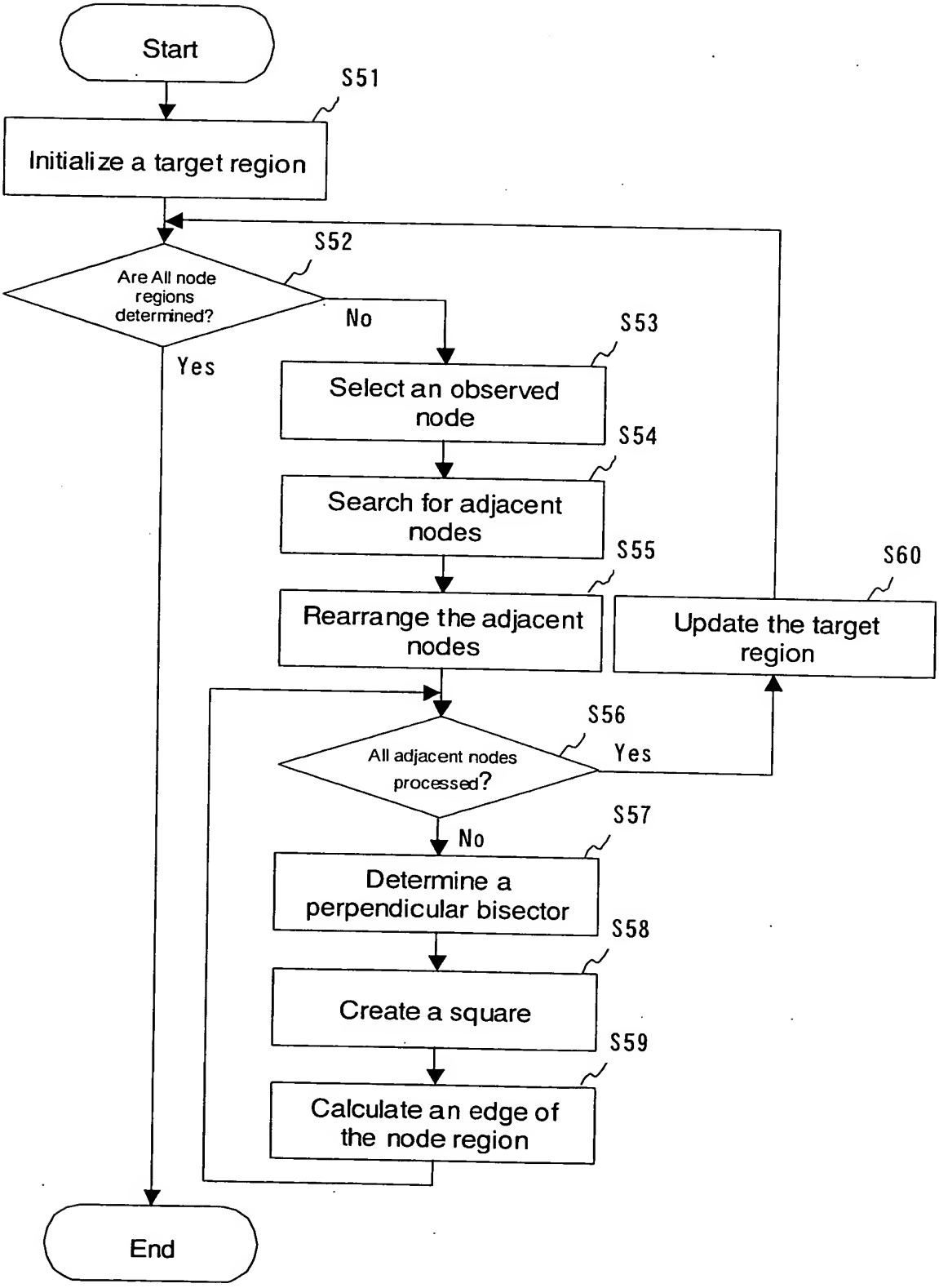

Start
S51
Initialize a target region
S52
Are All node regions determined?
No
Yes
S53
Select an observed node
S54
Search for adjacent nodes
S55
Rearrange the adjacent nodes
S60
Update the target region
S56
All adjacent nodes processed?
Yes
No
S57
Determine a perpendicular bisector
S58
Create a square
S59
Calculate an edge of the node region
End

FIG. 24

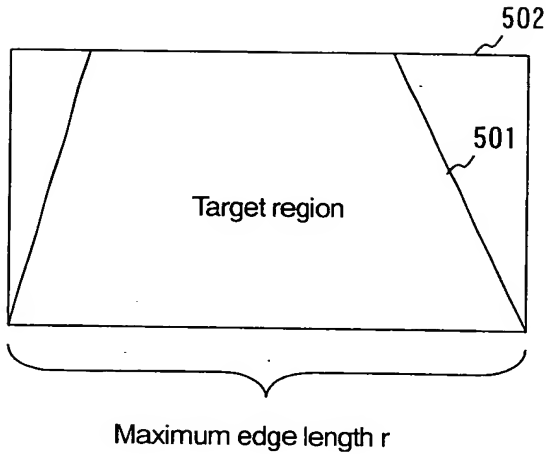


FIG. 25

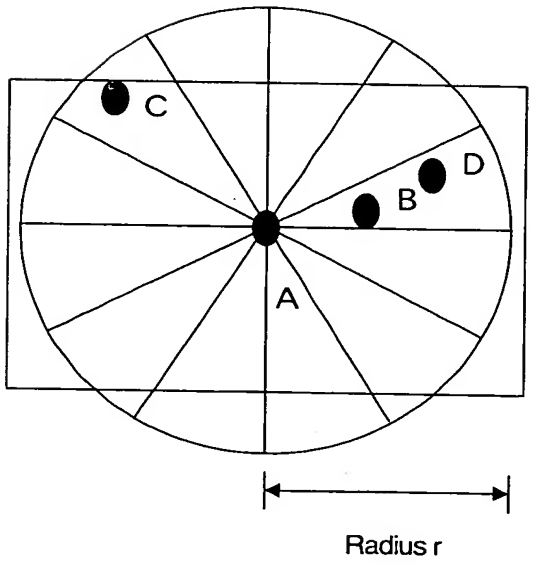


FIG. 26A

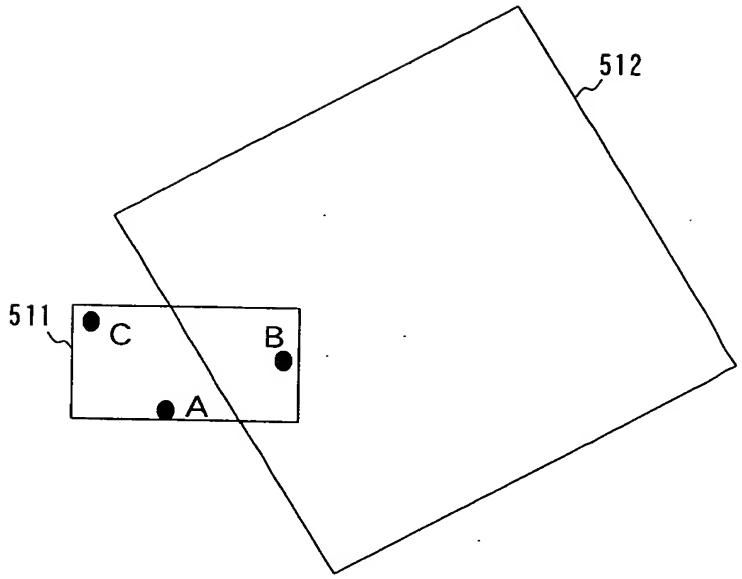


FIG. 26B

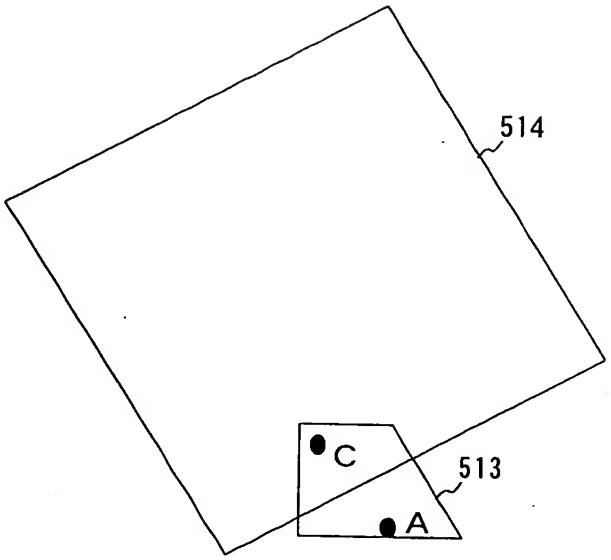


FIG. 26C

FIG. 27

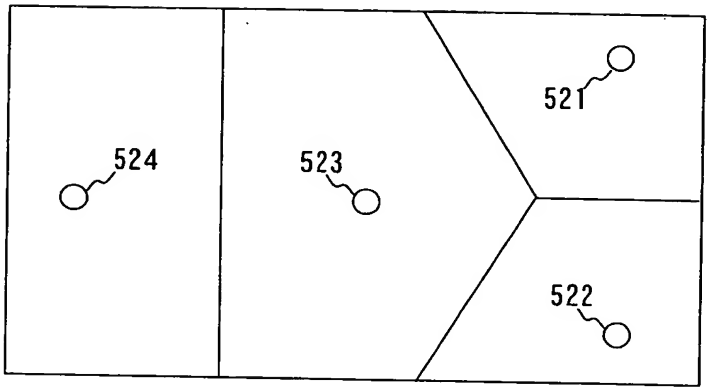
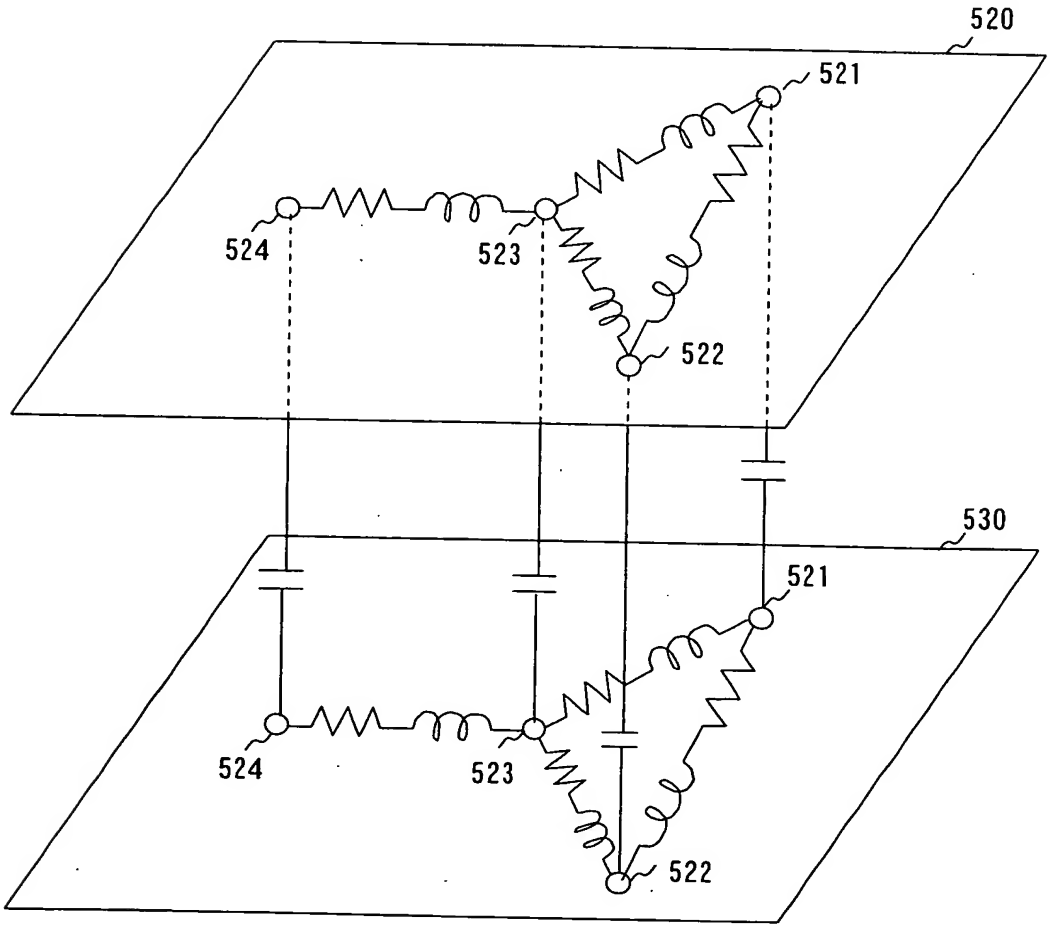



FIG. 28